CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	•The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. •As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	•The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

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Eco Friendly Electricity Export to Grid

Version 04

07/11/2009

A.2. Description of the small-scale project activity:

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Purpose

The main purpose of the project activity is to reduce GHG emissions by generating clean electricity from wind energy (clean source) and export the same to grid. The installed Wind Turbine Generators (WEGs) are of capacity 1250 kW (7 nos) of Suzlon make, which would generate approximately 20.72 Million Units of electricity every year. For six out of seven WEGs, electricity exported is sold to TNEB, whereas for one of out seven WEGs, electricity exported is adjusted against import of electricity from TNEB at the distillery of the project promoter through a wheeling arrangement. Contributing to a clean and safe environment is the prime objective of this project activity. The project activity's contributions to sustainable development are as follows:

Socio-Economic

- The project activity has lead to an investment of Rs.428 million for commissioning of the seven WEGs in a rural location, which would not have taken place in absence of project activity
- The project activity influences business activities of the local community
- Employment opportunities were created during the commissioning of the WEGs and also for maintenance during the life time of the project activity
- The infrastructure in and around the project area improves due to the project activity, this includes development of road network, communication and also encourages industrial development in the area
- Diversification of the energy generation mix, which is dominated by conventional fuel based generation units

Environmental

Wind power's environmental advantages are obvious. Compared to other renewable sources of energy, wind power has a relatively small "ecological footprint". The project activity's contribution to the environment is as follows:

- Conservation of natural resources and non-renewable fossil fuels
- The presence and operation of WEGs does not cause any ill effects to the human health
- Waste disposal is not a problem, as there are no waste generated from the WEGs while generating electricity
- The project activity does not have any ill effects on the environment

A.3. Project participants:

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Name of Party involved ((host indicates a host party)	Private and/or public entity(ies) project participants (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host party)	Bannari Amman Sugars Limited (BASL)	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

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India

A.4.1.1. Host Party(ies):

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Country: India

A.4.1.2. Region/State/Province etc.:

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State : Tamil Nadu
District: Tirunelveli

A.4.1.3. City/Town/Community etc:

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Irrukkandurai, Karunkalam, Radhapuram villages of Radhapuram Taluk

Sl. No	Location & SF No.	WEG Capacity (kW)	HT SC No (TNEB)	Loc No.
1	Karunkulam S.F.No.41/3B	1250	1090	S347
2	Radhapuram S.F.No.564/2	1250	1116	S176

3	Radhapuram S.F.No.616/1C2B2F	1250	1119	S185
4	Irrukkandurai S.F.No.1447/1,2	1250	1125	S259
5	Irrukkandurai S.F.No.1475/7	1250	1126	S256
6	Irrukkandurai S.F.No.1384/2E	1250	1128	S349
7	Irrukkandurai S.F.No.1468/3p	1250	1142	S360

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

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The project activity sites are located at Karunkulam, Irrukkandurai villages of Radhapuram taluk, situated in Tirunelveli district of Tamil Nadu, India. Tirunelveli district is located between 8°08' and 9°23'North latitude and 77°09' and 77°54'East longitude[1]. The project activity comprises of 7 WEGs distributed across two villages. The nearest railway station is at Nagercoil and nearest airport is at Tuticorin which are at a distance of 15 kilometers and 52 kilometers respectively.

[1] http://www.nellai.tn.nic.in/general.html#geo_data

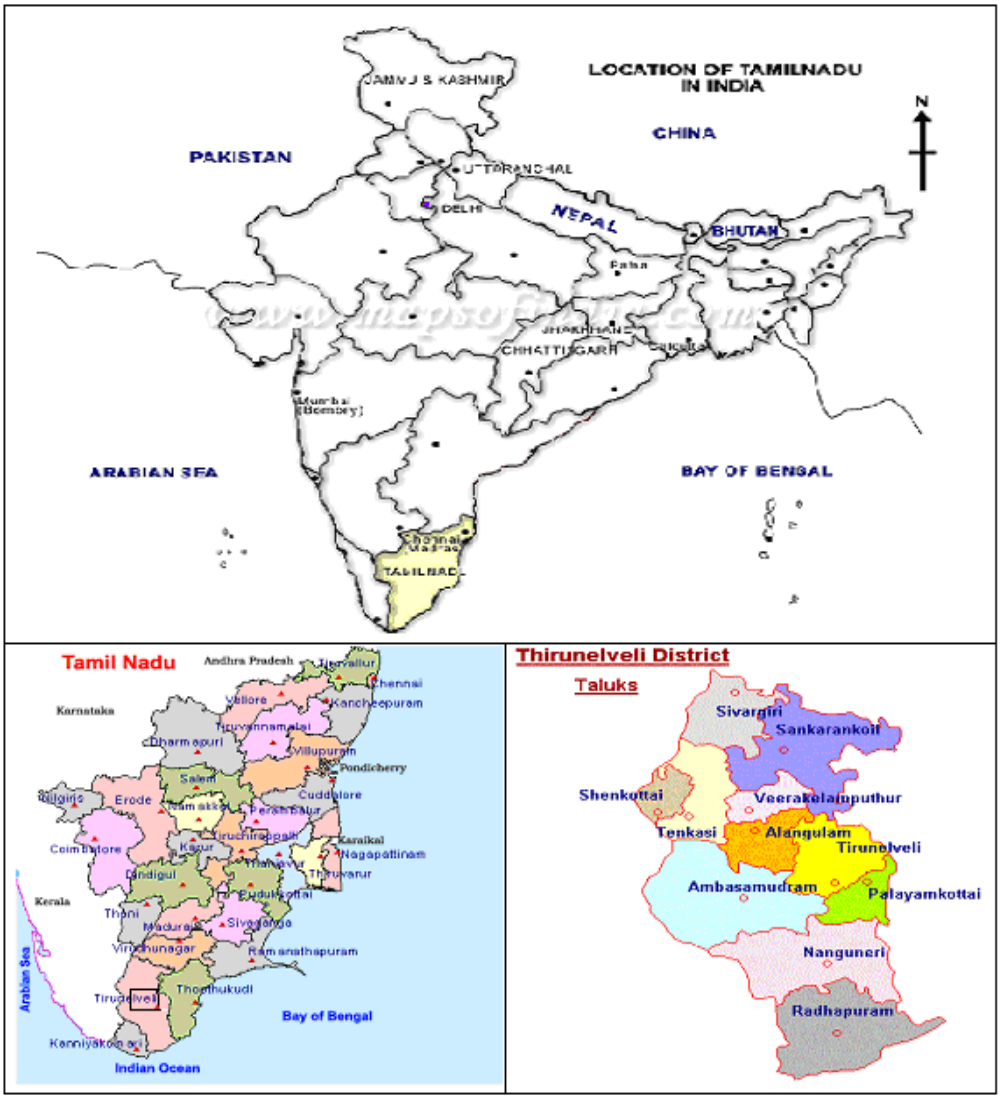

Fig 4. 1 Location of the project activity

A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

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As per Appendix B of the simplified modalities and procedures for small-scale project activities, the project activity falls under Type I. D category. The raw materials used in manufacturing of WEGs are not hazardous in nature and disposal after the life time of WEGs does not have any major ill effects on the environment. The WEGs installed in this project activity from a reputed manufacturer.

The technology used, design, efficiency and reliability of a WEG and its components greatly influence the performance. The project consists of 7 WEGs of 1250 kW of Suzlon make. The technical specification of Wind Energy Generator is as follows:

Model:	**S. 64**
Rated Power	1250 kW
Hub Height:	65 mts
Rotor Diameter:	64 mts
Rotor blade material	Glass Fibre-Reinforced Plastics
Regulation	Pitch regulated
No. of Blades	3
Generator: Type	Asynchronous 4/6 pole
Braking: Aerodynamic brake	3 independent systems with blade pitching
Mechanical brake	Spring applied hydraulically released disk brake
Yaw Drive: Method of operation	4 Active electrical yaw motors
Bearing type	Polyamide slide bearing

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Year	**Estimate of GHG abatement (in tCO_2e)**
2007-08	19,269
2008-09	19,269
2009-10	19,269
2010-11	19,269

2011-12	19,269
2012-13	19,269
2013-14	19,269
2014-15	19,269
2015-16	19,269
2016-17	19,269
Up to a period of Ten years	**192,690**

A.4.4. Public funding of the small-scale project activity:

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There is no public funding available for this project activity from any of the Annex I countries.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

Appendix C of the simplified Modalities and Procedures for small scale CDM project activities says that, "Debundling" is defined as the fragmentation of a large project activity into smaller parts. With reference to the criteria mentioned, this project activity is not a de-bundled component of a large project activity as there is no registered small scale CDM project activity (in the previous 2 years) or an application to register another small scale CDM project activity by the same project proponent, in the same project category and technology / measure with project boundary within one kilometer radius of this project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

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Title: "AMS I.D. Grid connected renewable electricity generation", Version 11, EB 31

Reference:
http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_UYF1PQNDY5FZ4VH4HZ28FYAP13SI9W

B.2 Justification of the choice of the project category:

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The project activity falls under the following CDM project category:

Type I (Renewable Energy Projects) Category D (Grid connected renewable electricity generation)

Classification	Justification
Type I – Renewable Energy projects	The project activity involves generation of electricity using the wind energy, which is a renewable source.
Category 'D' – Grid connected renewable electricity generation	The project activity supplies the generated electricity to the Tamil Nadu Electricity Board (TNEB) grid.

As per Appendix B of the simplified modalities and procedures for small-scale project activities, the project activity is eligible to use the baseline calculation provided in methodology AMS I.D. The applicability to the methodology is described below:

AMS I.D Applicability conditions	Project applicability
This category comprises renewable energy generation units, such as photovoltaic's, hydro, tidal/wave, wind, geothermal, and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.	The project activity involves wind energy generating units that supply electricity to the southern regional electricity distribution system of India that is supplied by a number of fossil fuel fired units. Hence applicability condition is satisfied.

If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component.	The project has only renewable components with a capacity of 8.75 MW (is lower than 15MW eligibility limit). Hence applicability condition satisfied.
For project activities adding renewable energy capacity, to qualify as a small scale CDM project activity, the aggregate installed capacity after adding the new units should be lower than 15 MW.	The project activity is the installation of new renewable energy capacity where currently no power generation occurs. The aggregate capacity of these units is 8.75 MW which is lower than the threshold limit of 15 MW.
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	Not Applicable

Eligibility as a small-scale CDM project activity:

The table below demonstrates, following the "Simplified modalities and procedures for small-scale project activities" and its recent revisions, the eligibility of the project activity as a small-scale project activity and confirms that it will remain under the small-scale limits over the crediting period.

Criteria	Eligibility
For Type I: Demonstrate that the capacity of the project activity will not exceed 15 MW.	The project activity involves 7 WEGs of capacity 1250 kW. The sum of maximum rated capacity of all the WEGs is 8.75 MW (Within the 15 MW threshold).

B.3. Description of the project boundary:

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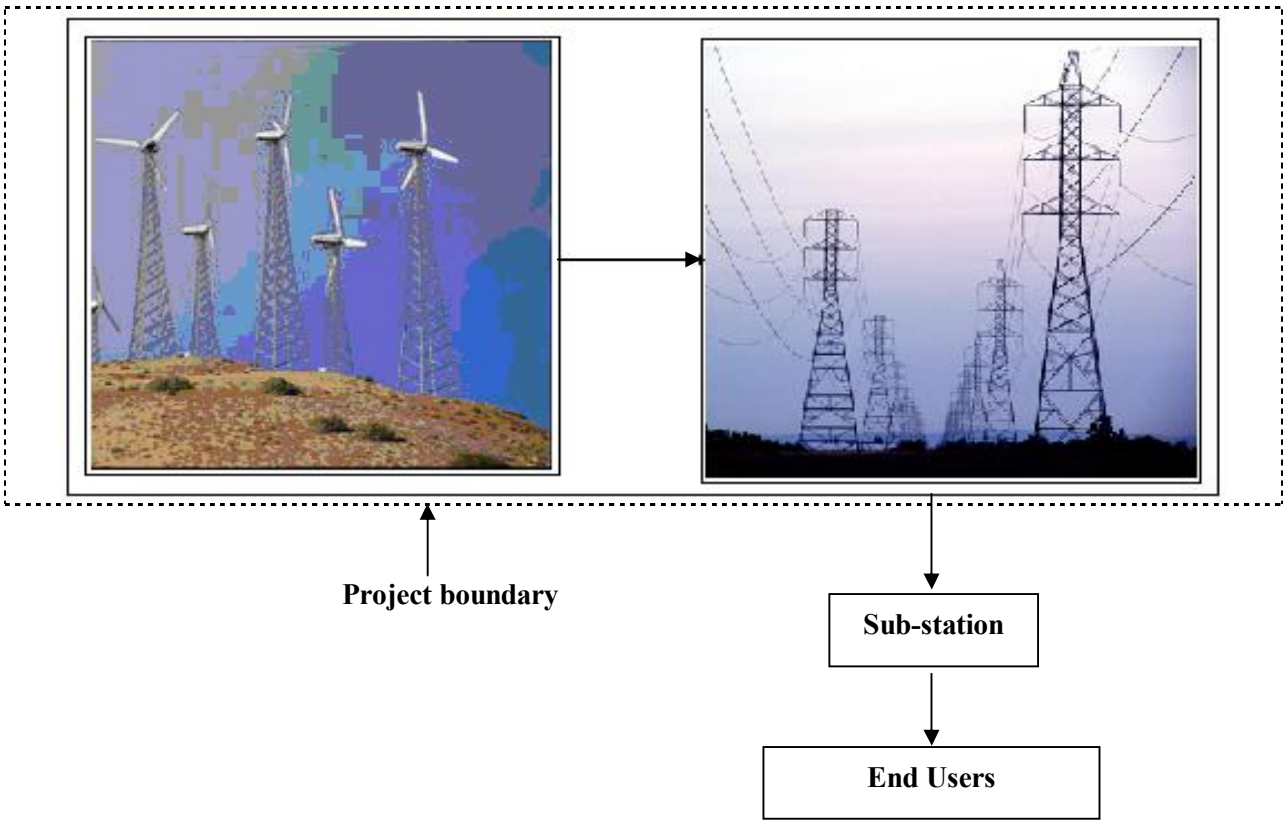

B.4. Description of baseline and its development:

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As per the methodology (AMS I.D) specified for this project category in Appendix B to simplified modalities and procedures, "The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient calculated in a transparent and conservative manner".

Whereas the kWh produced by the WEGs can be monitored directly through energy meters, the methodology provides four optional methods for the calculation of emission factor. The option "(a) Average of the approximate operating margin and the build margin" has been used in this document to calculate the emission factor.

The project activity consists of seven Wind Turbine Generators (WTGs) of 1.25 MW capacity each, and is located in Tirunelveli district of Tamil Nadu, India. For six WTGs, TNEB makes payments to the project promoter against the electricity exported to the grid. For the remaining one WTG (HTSC No. 1125), BASL has an agreement with TNEB for wheeling of power, wherein electricity exported from the WTG is adjusted against electricity imported at the distillery of BASL at Erode, Tamil Nadu. The project promoter

does not directly receive a payment from TNEB for the exported electricity. Instead an adjustment is made in the payments for import of electricity from the gird at their distillery. There is no difference in the physical operation of the WTG (HTSC 1125) from that of other WTGs in the project activity.

The power generated from HTSC 1125 displaces electricity generation in grid connected power plants as in the case of other WTGs in the project activity. The BASL distillery relies on both electricity imports from grid and electricity generation from captive DG sets to meet its power requirements. However, the baseline for the project activity remains electricity generation in gird-connected power plants. Although the term "wheeling" is used, there is no dedicated transmission line for transmitting power from the WTG (HTSC 1125) in Tirunelveli, Tamil Nadu to the distillery in Erode, Tamil Nadu. Instead, electricity is simply exported to the TNEB grid from the WTG, electricity is imported from the TNEB grid at the distillery plant, and a financial adjustment is made in the bills for payment of electricity imports at the distillery. The amount of power generation and the running hours of the DG sets at the distillery have not been affected by the wheeling arrangement. DG sets are operated at the distillery on a standby basis. TNEB issues regular planned and unplanned power cuts in the region. The schedule for the planned power cuts is notified in advance through TNEB circulars. DG sets are operated to maintain continuous and steady state operations at the distillery, which can not be compromised when the power from the grid is unavailable. In conclusion the baseline for the project activity is the emissions resulting form power generation in grid connected power plants.

Since all seven WTGs export power to the TNEB grid, which is a part of the southern regional grid, for the calculation of baseline emission factor, all generating sources connected to the southern regional grid of India are considered. Therefore the baseline for the project activity would be the product of kWh generated by the WEGs and the emission factor of the southern regional grid. Central Electricity Authority (CEA) keeps an account of all such generation (a single point source in the country for grid operation and management data) and has access to the data from these generating stations. An annual publication from CEA, Performance Reviews of Thermal Power Plants provides details from each generation units and net inter state purchases.

CEA has calculated and published a "CO_2 Database for power sector for CEA-India". The emission factor of the grid as per the methodology has been calculated using the combined margin method. The emission factors calculated using the combined margin method is 0.93 tonnes of CO_2 per MWh.

(BEF Value for Southern Regional Grid-India has been adopted from the "CO_2 Baseline Database for power sector for CEA" June 2007, published by Central Electricity Authority of India).

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The project reduces anthropogenic emissions of greenhouse gases by sources below those that would have occurred in absence of the proposed CDM project activity.

Barriers and Additionality

The project promoters had faced the following barriers during commissioning of the project.

Investment Barrier

The wind power sector is relatively a new segment for the project proponent, since their main area of interest is oriented towards sugar industry. The project proponent has taken a risk by investing in wind power project.

Economic feasibility is the major criteria for implementation of any project activity. The feasibility of setting up a wind farm at a particular location is primarily dependent on two factors which determine the financial returns from the project activity are as follows:

a) The average annual energy generation expected at the site and
b) The rate at which the energy is sold (Rs.2.70 /kWh) to the party/grid for six WTGs.
c) The tariff for energy wheeled (Rs. 3.50 /kWH) to distillery for one WTG.

For the purpose of IRR computation, BASL had conservatively taken the figure 2.9 million units per WEG (80% of 3.7 Million Units as guaranteed by the manufacturer).The estimated annual generation at BASL project site was a conservative estimate of 80% generation which was taken from the manufacturer's guarantee of 3.7 Million WEG per year (i.e., 80% of 3.7 Million units = 2.9 Million units per WEG).

The project promoter signed Power Purchase Agreements for all WTGs in February-March 2005 for sale of electricity to TNEB at a rate of Rs. 2.70 per kWh. For one out of the seven WTGs, HTSC 1125, the original PPA for sale to grid is dated 2nd March 2005. A supplemental agreement was signed for the WTG on 23rd June 2006 for wheeling of power to the BASL Distillery at Erode, Tamil Nadu. The wheeling arrangement came into effect in the same month and is reflected in the respective TNEB electricity generation statement (JMR). The rate of import of power from the TNEB grid is Rs. 3.50 per kWh.

Based on the above parameters, a financial analysis was carried out by the project proponent and Internal Rate of Return was calculated as "8.79%", which was below its Weighted Average Cost of Capital (WACC) 9.19% even at optimistic projection. The vital investment decision factor in normal business

practice is that the expected rate of return from a project activity should be higher than the Weighted Average Cost of Capital (WACC) available for the project activity.

A sensitivity analysis was carried out with optimistic projections to assess the feasibility of project activity. The assumptions and results obtained have been listed below:

a) 10 % increase in generation and 10 % decrease in operation & maintenance cost- Results obtained: "*IRR without CDM revenue -10.62%"*.

b) 10 % decrease in generation and 10% increase in operation & maintenance cost – Results obtained: "*IRR without CDM revenue -6.83%"*.

The purpose of conducting sensitivity analysis was to assess the return on equity of project activity under varying circumstances. The results show that even with an increase of 10% in total generation from the WEGs with an IRR 10.62%, which is obtainable only in cases of good wind season and longer receding monsoon. The project would not prove to be financially viable for the project promoter.

This was a significant barrier to the project proponent and this meant that implementation of the project activity will result in losses to the project promoter. Under normal circumstances BASL would not have gone ahead with the project activity.

However the CDM revenue from the sale of carbon credits when considered in the project activity's the IRR improves to "10.96%" when compared to the actual IRR "8.79%". The Internal Rate of Return with CDM revenue is above the threshold WACC value (9.19%). Hence it can be stated that the financial attractiveness of the project activity is improved by the CDM revenue.

Selling the generated power to a third party would prove profitable to the project promoter and will improve the rate of return, but third party sale in the state of Tamil Nadu was not allowed during the project conceptualization, which proved to be a setback to the project promoter. The project proponent had to sell the power to the grid at Rs. 2.70/kWh which is not attractive amount when compared to the neighboring states of Tamil Nadu.

Post commissioning of the project activity, it was observed that over a period of one year of wind mill's operation, the actual generation achieved was only 58% (2.147 Million units per WEG) of the manufacturer guaranteed generation (3.7 Million units per WEG). The results have proven to be disappointing to the project proponent.

If the same trend continues wind energy based power generation would prove to be a business risk and the project activity will not be a feasible option to the project proponent and even with the CDM revenue the returns from project activity does not prove to be sustainable.

Technological barriers

i. The project proponent has installed 1250 kW (high capacity) WEGs. At the time of project start, BASL was one of the first few promoters who had opted for higher capacity WEGs. The prevalence of higher capacity WEGs installed in India was only 3% and also there were very few successful projects with higher capacity WEGs. The project promoters were among one of the very few promoters in Tamil Nadu to go above 5 MW capacity and successfully implement the project. Despite the prevailing scenario, the project proponent took a risk and decided to go ahead with higher capacity WEGs.

The table below gives a clear understanding about the market share of higher capacity WEGs prior to the project start[2].

Parameters	Unit	As on March 2004
Total installed capacity	MW	2489.1
Capacity with WEG $\geq$ 1.25 MW	MW	267.05
Total No. of WEGs	In No's	7013
WEGs $\geq$ 1.25 MW	In No's	213
Share of high capacity WEGs	% in MW	10.73
Share of high capacity WEGs	% in Nos.	3.04

ii. Wind power projects has got its own advantages and disadvantages, its primary disadvantage is its intermittence, inconsistent and highly variable from day to day and season to season. Wind doesn't blow consistently or even all the time and it has a relatively low energy production density which (as measured in kWh per acre of generation facility) and requires multiple wind turbines over many dozens or hundreds of acres to produce the same amount of electricity as a coal or nuclear plant occupying only a few acres.

Other barriers

[2] As indicated in the website of Wind Power India "Manufacturers-Wise Wind Electric Generators Installed In India" dated on 31.03.2005;

Tamil Nadu as a state stands number one in wind power generation, but still there are certain constraints faced by the project promoters which are as follows:

1. Delay in payments by the electricity board for the sale of power is also one of the major problems encountered by project promoter and by other peers in the same industry. This proves to be a big hurdle, since the project promoter has got his commitments towards financial institutions on regular basis.

2. Tariff rate is low when compared to the neighboring states

The tariff rate offered in Tamil Nadu state is comparatively less when compared to the tariff rate offered in the neighboring states. The table below indicates the difference in tariff rates between the three states

Sl No.	State	Tariff Rate/kWh
1	Tamil Nadu*	Rs. 2.70
2	Karnataka	Rs. 3.05
3	Andhra Pradesh	Rs. 2.88

**The table states that the tariff rate offered by the TNEB does not prove to be attractive.*

Summary:

The lack of economic attractiveness coupled with technological and other barriers proved as significant barriers to the project proponent. The consideration of prospective carbon revenues improved the rate of return and economic viability of the project activity on long term basis and has motivated the project promoter in implementing the project activity. The impacts of CDM registration include, access to CDM revenues, institutional capacity building etc. Registering the project activity as a CDM activity provides revenue as one of the annual cash flows, expected after the registration. The financial viability of the BASL project activity, the project's cash flow would improve with CDM revenues.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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The methodology AMS I.D states "the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient measured in (kg CO_2e/kWh)".

The emission reductions (ER_y) by the project activity during a given year y is

$ER_y = EG_y * EF_y$……..(1)

Where EG_y is the electricity supplied to the grid, EF_y is the CO_2 emission factor of the grid as calculated below:

The emission factor EF_y of the grid is represented as a combination of the Operating Margin and the Build Margin. Considering the emission factors for these two margins as $EF_{OM,y}$ and $EF_{BM,y}$.

Then, EFy is given by

$EFy = W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y}$ ……..(2)

Where,

w_{OM}	Weight of the operating margin emission factor (0.75 for wind power projects as per ACM0002, Ref: Version 06, 19th May, 2006 Pg No. 10)
$EF_{OM,\ y}$	Operating margin emission factor calculated as per ACM0002
w_{BM}	Weight of the build margin emission factor (0.25 for wind power projects as per ACM0002, Ref: Version 06, 19th May, 2006 Pg No. 10)
$EF_{BM,y}$	Build margin emission factor calculated as per ACM0002

The Operating Margin emission factor $EF_{OM,y}$ is defined as the generation—weighted average emissions per electricity unit generated (tCO_2/GWh) for all sources serving the southern grid, excluding zero- or low-operating cost power (hydro, wind and nuclear) , based on the average of the three years most recent data and using the following equation

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \, x \, COEF_{i,j}}{\sum_{j} GEN_{j,y}} \quad \text{……..(3)}$$

Where,

$F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by relevant power sources *j* in year(s) y,

j refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports to the grid.

$COEF_{i,j,y}$ = CO_2 coefficient of the fossil fuel, (i) , (tCO_2) / mass or volume unit of the fuel) , taking into account of the carbon contents of the fuels used by relevant power plant j , and the present oxidation of the fuel in year(s) , y , and

$GEN_{j,y}$ electricity (MWh)delivered to the grid by power plant j.

$EF_{OM,y}$ =Total GHG emissions and electricity generation supplied to the grid by the power plants connected to the grid excluding zero- or low-operating cost sources.

The CO_2 emission coefficient COEF is obtained as :

$$COEF_i = NCV_i \otimes EF_{CO2,i} \otimes OXID_i \quad \text{.....(4)}$$

Where:

NCVi is the net calorific value (energy content) per mass or volume unit of a fuel i,

$OXID_i$ is the oxidation factor of the fuel

$EF_{CO2,i}$ is the CO_2 emission factor per unit of energy of the fuel i :

The build margin is calculated as the weighted average emissions of recent capacity additions to the reference grid, based on the most recent information available on plants already built for sample group *m* at the time of PDD submission. The sample group *m* consists of,

- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Further, power plant capacity additions registered as CDM project activities have been excluded from the sample group *m* of South India Regional grid mix.

The PDD has adopted *ex-ante* option for build margin calculation.

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \, x \, COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogus to the variables described for the simple OM method above for plants m.

Emission Reductions (ER_y):

The emission reductions from the project activity are equal to the baseline emissions minus project emissions and Leakage. Since the project activity generates electricity from wind, which is a zero emission source, there are no associated project emissions. As per AMS I.D, leakage need not be considered since there is no transfer of energy generating equipment from another activity or transfer of existing equipment to another activity.

Therefore, emission reductions from the project activity directly equal the baseline emissions.

$ER_y = EF_y – PE_Y - L_{y,}$ where

PE_y = Project Emissions in year $_y$ (nil in this case)

L_y = Leakage in y (nil in this case)

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	EF_y
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of Southern Regional Grid (SRG)
Source of data used:	CO_2 baseline database for Indian Power Sector provided by the Central Electricity Authority (CEA)
Value applied:	0.93
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated from data provided by the CEA in the CO_2 baseline database for Indian Power Sector
Any comment:	Calculated as weighted average of OM and BM emission factor

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 operating margin emission factor for the Southern Regional Grid (SRG)
Source of data used:	CO_2 baseline database for Indian Power Sector provided by the Central Electricity Authority (CEA)
Value applied:	1.01
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is the CO_2 operating margin emission factor for the Southern Regional Grid (SRG) as provided by the CEA.
Any comment:	

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh

Description:	CO_2 build margin emission factor for the Southern Regional Grid (SRG)
Source of data used:	CO_2 baseline database for Indian Power Sector provided by the Central Electricity Authority (CEA)
Value applied:	0.71
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is the CO_2 build margin emission factor for the Southern Regional Grid (SRG) as provided by the CEA.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

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Ex-ante calculation of emission reductions (ER_y):

As per formula described in Section B.6.1, following

$ER_y = BE_y = (EG_y \times EF_y)$

$ER_y = (EG_y \times EF_y)$

ER_y = 20,720x 0.93 = 19,269 tCO_2e/yr

Ex-ante Estimation of Energy Generation (EGy):

Energy generation per year has been considered as 80%[3] of the estimated generation data for each WEG provided by the equipment suppliers.

Estimated generation per WEG = 3.7 million units

Sum of estimated generation for all WEGs = 25,900 MWh/yr

EG_y = 25,900 x 80% = 20,720 MWh/yr

Ex-ante determination of baseline emission factor (BEFy):

As per formula described in section B.6.1 above,

BEF_y = Combined margin emission factor = $w_{OM}.EF_{OM, y} + w_{BM}.EF_{BM, y}$

BEFy = 0.75*1.01 + 0.25*0.71 = 0.93 tCO_2e/yr

Simple Operating Margin (OM) values for three years and Build Margin (BM) values have been directly taken from CEA database. Refer Annex 3 for details.

[3] Arrived by applying grid availability factor,machine availability and internal losses on the estimated generation. Reference - TNERC Discussion Paper on Tariff Related Issues of NCES - Page 2 of Annexure I - http://tnerc.tn.nic.in/regulation/draftncestariff.pdf

B.6.4 Summary of the ex-ante estimation of emission reductions:

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Year	Energy generated (EGy)	Emission Factor (EFy)	Baseline emissions (BEy)	Estimation of Leakage	Estimation of Project Emissions	Emission Reductions (ER_y)
	MWh	tCO_2/MWh	tCO_2e	tCO_2e	tCO_2e	tCO_2e
2007-08	20,720	0.93	19,269	0	0	19,269
2008-09	20,720	0.93	19,269	0	0	19,269
2009-10	20,720	0.93	19,269	0	0	19,269
2010-11	20,720	0.93	19,269	0	0	19,269
2011-12	20,720	0.93	19,269	0	0	19,269
2012-13	20,720	0.93	19,269	0	0	19,269
2013-14	20,720	0.93	19,269	0	0	19,269
2014-15	20,720	0.93	19,269	0	0	19,269
2015-16	20,720	0.93	19,269	0	0	19,269
2016-17	20,720	0.93	19,269	0	0	19,269
Total for Ten Years of crediting period						**192,690**

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	MWh/yr
Description:	Net electricity supplied to the facility. This data is quantitative.
Source of data to be used:	BASL / TNEB records
Value of data applied for the purpose of	19,269

calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	100% of the data is to be monitored and measured online. The data will be archived electronically. The Form B from TNEB forms the basis for calculation of net electricity generated.
QA/QC procedures to be applied:	This data will be used for the calculation of project electricity generation. The internal audit procedures will be followed for QA/QC. Form B forms the basis for net electricity generation by the PA and hence CER's. QA/QC procedures followed as per the Internal Audit procedures practiced by the PP.
Any comment:	Instrument used: Energy Meter Data Type: Quantity

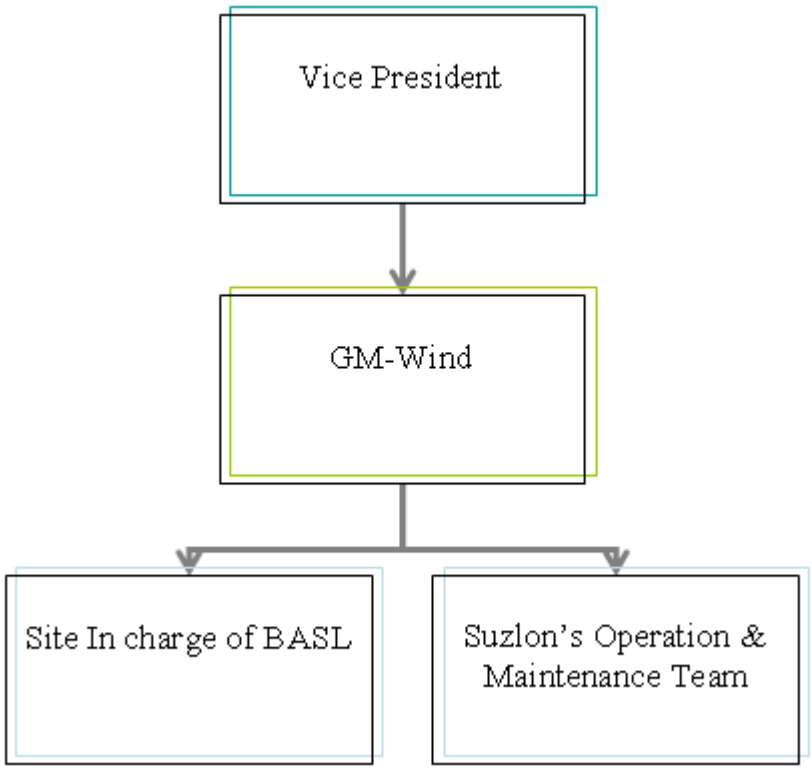
B.7.2 Description of the monitoring plan:

>>

The project promoters have entered into agreement with the WEG Supplier- Suzlon Energy Limited for operation and maintenance of their seven WEGs for a period of ten years (the agreement is renewable). The WEG supplier has a dedicated and technically well equipped team to take care of the regular operation and maintenance of each WEG.

Monitoring:

The electricity generated by the WEGs is monitored through energy meters connected to the individual WEGs. The TNEB personnel have a regular monthly schedule for capturing the readings from the main meter and daily readings are noted by the WEG operation & maintenance (O&M) contractor's personnel and recorded in log books and uploaded daily on the website which is further downloaded by the customer (BASL) the recorded data is further verified by the BASL personnel on day to day basis. The individual WEG generation figures are compiled and verified with the main energy meter readings after allowing for T&D losses. A monthly generation report is prepared showing the aggregate and individual energy generation of WEGs. The recorded monthly energy generation values can be verified with TNEB's monthly generation report (Form B). The diagram below illustrates the operational management team at BASL



B.8 Date of completion of the application of the baseline and monitoring methodology and the

name of the responsible person(s)/entity(ies)

>>

Date of completion of the baseline: 25/06/2007

Entity determining the baseline:

M/s. BASL Limited

Mr. Murugesan

1212, Trichy Road,

Coimbatore - 641 018.

Tamil Nadu, India

Telefax : +91 422 2305454

The project promoter is the entity determining the baseline as mentioned in the Annex I of this document.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

25/11/2004

C.1.2. Expected operational lifetime of the project activity:

>>

20 years 0 months

C.2 Choice of the crediting period and related information:

>>

Fixed crediting period of 10 years will be adopted by project promoter

C.2.1. Renewable crediting period

>>

Not Applicable

C.2.1.1. Starting date of the first crediting period:

>>

Not Applicable

C.2.1.2. Length of the first crediting period:

>>

Not Applicable

CDM – Executive Board

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

01/08/2007 / or upon registration with the UNFCCC. The project proponent affirms that they would not start the crediting period before actual registration happens.

C.2.2.2. Length:

>>

10 years, 0 months

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

Wind Power Projects do not fall under the purview of Environmental Impact Assessment (EIA) Notification of the Ministry of Environment and Forests -Government of India (Reference: Environment Impact Assessment Notification S.O.60 (E), dated 27/01/1994- SCHEDULE-I and its subsequent amendments) and also there are no major environmental impacts.

Impact on Air

Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation.

Impact on Noise

Noise is generated due to the movement of rotor blades. It has no direct effect on the population, as the area is less populated and noise generated will be attenuated by ambient conditions.

Impact on Land

The operation of WEGs does not involve usage of any type of fuel for generation of electricity and also the material used in WEGs are easily disposable and impact on the land is nil.

Impact on Water

The operation of WEGs does not involve usage of hazardous chemicals or does not involve any usage of water.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

Not Applicable.

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>>

A brief description about the project activity and a questionnaire was sent by project promoter during the period 4/09/2006 to 06/09/2006 to the identified stakeholders, the stakeholders were encouraged to give their feedbacks and suggestions pertaining to the project activity. The stakeholders identified for the project activity are listed below:

- Local farmers and residents
- Consultants
- Equipment suppliers
- Local Panchayat

The local population in the vicinity of the project activity comprises mainly of farmers and rural population, who are the major stakeholders in the project activity. The other stakeholders are other parties involved in the construction, operation of the project activity. BASL had informed the relevant stakeholders to obtain the necessary clearances.

The questionnaire and responses from the stakeholders were collected and documented during the period 12/09/2006 to 15/09/2006. The compiled documents will be made available to the DOE's at the time of validation of the project activity.

E.2. Summary of the comments received:

>>

The stakeholders have not put forth any negative comments about the project activity, instead they have appreciated the initiative taken up by the project participants for promoting wind power projects in their locality. Comments received were encouraging and stakeholders have encouraged the project promoters to initiate some more projects similar to this project activity.

E.3. Report on how due account was taken of any comments received:

>>

Since the project activity received no negative comments from the concerned stakeholders, no corrective action was to be made.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Bannari Amman Sugars Limited (BASL)
Street/P.O.Box:	1212, Trichy Road,
Building:	
City:	Coimbatore
State/Region:	Tamil Nadu
Postfix/ZIP:	641018
Country:	India
Telephone:	+91-422-2305454
FAX:	+91-422-2305599
E-Mail:	rmurugesan@bannari.com
URL:	www.bannari.com
Represented by:	
Title:	Vice President
Salutation:	Mr.
Last Name:	R
Middle Name:	
First Name:	Murugesan
Department:	Finance
Mobile:	+91-9894234567
Direct FAX:	+91-422-2305599
Direct tel:	+91-422-2305454
Personal E-Mail:	rmurugesan@bannari.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding as a part of project financing from parties included in Annex I of the convention is involved in this project activity.

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Annex 3

BASELINE INFORMATION

The Central Electricity Authority (CEA) has published the baseline emission factors database for the various electricity grids in India. The emission factors have been calculated based on UNFCCC guidelines (ACM0002). For further details on the calculation methods and data used, please refer the following weblink:

http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

In the CEA database, the simple operating margin, build margin and combined margin emission factors of the regional electricity grids have been provided separately for two cases; Including electricity imports and Excluding electricity imports from other regional grids. Since, emission factors excluding imports are lower, the same has been considered as a conservative approach. The below data extract from the CEA database (Table AN.3) shows the simple operating margin data for the most recent three year data vintage (shown highlighted) and the build margin data (shown highlighted).

Table AN.3: Extract from CEA CO_2 database

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE						
VERSION			**2.0**			
DATE			**21 June 2007**			
BASELINE METHODOLOGY			**ACM0002 / Ver 06**			
EMISSION FACTORS						
Simple Operating Margin (tCO2/MWh) (excl. Imports)						
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
North	0.98	0.98	1.00	0.99	0.97	0.99
East	1.22	1.22	1.20	1.23	1.20	1.16
South	1.02	1.00	1.01	1.00	1.00	1.01
West	0.98	1.01	0.98	0.99	1.01	0.99
North-East	0.73	0.71	0.74	0.74	0.71	0.70
India	1.02	1.02	1.02	1.03	1.03	1.02
Build Margin (tCO2/MWh) (excl. Imports)						
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
North					0.53	0.60
East					0.90	0.97

South					0.71	0.71
West					0.77	0.63
North-East					0.15	0.15
India					0.70	0.68
Combined Margin (tCO2/MWh) (excl. Imports)						
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
North	0.76	0.76	0.77	0.76	0.75	0.80
East	1.06	1.06	1.05	1.07	1.05	1.06
South	0.87	0.85	0.86	0.86	0.85	0.86
West	0.87	0.89	0.88	0.88	0.89	0.81
North-East	0.44	0.43	0.44	0.44	0.43	0.42
India	0.86	0.86	0.86	0.86	0.86	0.85

Annex 4

MONITORING INFORMATION
Parameters to be monitored and detailed monitoring procedures:

Net energy generation and export to the grid (MWh)	
Monitoring methods and procedures	This data will be measured continuously in the Project Promoter (PP)'s energy meters (microprocessor control panel) located at individual WEGs and also in the TNEB energy meters located at individual WEGs. The Technicians of the CDM team will record the generation data from the PP's meters on a daily basis in log books. The reading from TNEB meter will be recorded every month by TNEB personnel in the presence of site Engineer. The PP invoices the off taker (TNEB) on the basis of Form B / Joint Meter Reading sheets. All power transmission infrastructures downstream of the TNEB meter are part of the TNEB grid and therefore for the calculation of emission reductions, Joint Meter Reading sheets / Form B shall be considered. The monitoring records will be maintained at the PP's end for the entire crediting period plus two years.
QA/QC procedures	The PP's energy meter would be calibrated once in 3 years. The monthly TNEB meter reading would be cross-checked with the PP's meter data by the Site Engineer. In case the deviation in TNEB's recorded data is beyond the allowable limits for energy meters, the PP would request TNEB to calibrate/rectify the meter at the earliest. For the period of error, data would be adjusted as described under "Data uncertainties and adjustments". Responsibility of calibration will be with the Site Engineer.
Reporting	The Site Engineers (SE) will review the PP's energy meter log books on a daily basis and record the data in computer. On a daily basis, a compilation of the energy data from each WEG would be uploaded in the O&M Contractor's website. This website data would be accessible by the General Manager (GM) - Wind at the respective project promoter's administration office. The GM- Wind would take a print of the daily report from the website and file it. The GM would prepare a monthly consolidated report of the energy meter data. The monthly consolidated report would include reading provided by TNEB's monthly report for cross-checking purposes. The GM would forward the monthly reports in paper and electronic format to the Vice President (VP) Finance for review and approval.

Data archiving	Once the monthly reports are approved by the VP- Finance, it would be archived in paper at the respective administrative office by the GM. Electronic copy of monthly reports would be archived by the GM. Log books at the site would be archived by the Site Engineer.
Data uncertainties and adjustments	For this parameter, data uncertainties are likely during the following scenarios: • During error in meter • When meter is dismantled for O&M or calibration • When data is not recorded or records are lost Error in the meter will be usually identified during cross-checking the monthly energy reports. If an error is found in the TNEB meter, the data recorded by the PP's meter minus average transformer losses would be calculated and used for emission reduction determination for the error period. When the PP's meter is dismantled for O&M or Calibration, the reading recorded by the TNEB meter for that period would be noted and adjusted with the PP meter reading. When data or records are lost, the emission reductions would be calculated based on TNEB's monthly generation report.

Procedures for internal audit and Management review:

An internal audit of the project activity would be done on a half yearly basis by a special audit team. The audit team would comprise competitive persons who would be appointed by the VP-Finance. The team would audit the project for the below aspects among other things:

- Are the monitoring of CDM parameters done in line with the CDM PDD and CDM Manual (Under Development)
- Is the documentation of monitored CDM parameters done properly
- Are equipments calibrated and maintained as scheduled
- Is the quantity of CERs generated inline with that projected in the CDM PDD If not, what are the reasons for deviation?
- Are necessary corrective actions being taken to address deviations?
- Check the authenticity of data monitored and recorded by random cross-checking with other sources.

The audit team would submit their observations to the GM for his review and necessary action. The GM would instruct the CDM Team head to take the required corrective action if any suggested by the audit team.

CDM – Executive Board

Procedures for corrective actions for better future monitoring and reporting:

Errors or anomalies in the monitoring and reporting would be identified by the GM while reviewing the monthly CDM. Errors or deviations will also be identified during the half yearly internal audits. The CDM team Head (i.e., VP- Finance) would take up these matters during the half yearly CDM Team meetings (that normally would happen a few days after internal audit reports are prepared and submitted). The root cause of these errors would be discussed and appropriate action would be taken for better future monitoring and reporting. The corrective actions may include:

- Training of monitoring personnel where ever required
- Replacement or repair of equipments

Procedures for training of monitoring personnel:

- An initial training would be provided by the CDM consultant to all the monitoring personnel identified. Detailed monitoring procedures for each of the CDM parameters would be elaborated.
- Subsequent to the training program, the consultant would witness the actual monitoring on site and help with any difficulties faced by the personnel.
- The CDM – Head would closely inspect the monitoring activities till the mechanism works smoothly.

Procedures for maintenance of monitoring equipments:

- The Site Engineer would conduct a physical inspection of all the energy meters once a month
- Any maintenance requirements would be immediately attended
- The energy meters will undergo a preventive maintenance one a year
- The responsibility of maintenance will be with the Site Engineer
- Maintenance history card would be maintained for all energy meters

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Appendix 1

Abbreviations

AMS	Approved Methodology Small scale
BEF	Baseline Emission Factor
BM	Build Margin
CO_2	Carbon dioxide
CER	Certified Emission Reductions
CEA	Central Electricity Authority
CDM	Clean development mechanism
CM	Combined Margin
EIA	Environmental Impact Assessment
EB	Executive Board
GHG	Greenhouse Gas
HT SC	High Tension Service Connection
INR	Indian Rupees
IPCC	Inter Governmental Panel on Climate Change
IRR	Internal rate of return
kW	Kilowatt
MW	Mega watt
MWh	Megawatt hour
MT	Metric tones
MU	Million Units
MoEF	Ministry of Environment and Forests
MNES	Ministry of non-conventional energy sources
OM	Operating Margin
PPA	Power Purchase Agreement
PDD	Project design document
Rs	Rupees
tCO_{2e}	Tonnes of carbon dioxide equivalent
TNEB	Tamil Nadu Electricity Board
UNFCCC	United Nations Framework Convention on Climate Change
WACC	Weighted Average Cost of Capital
WEG	Wind Energy Generators
WPP	Wind Power Project

Appendix 2

List of References

- Kyoto Protocol to the United Nations Framework Convention on Climate Change
- Website of United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int
- UNFCCC document: Clean Development Mechanism, Simplified Project Design Document for Small Scale Project Activities (SSC-PDD), Version 03
- UNFCCC document: Simplified modalities and procedures for small scale Clean Development Mechanism project activities
- Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference manual
- Central Electricity Authority: CO2 Baseline Database
- http://cea.nic.in
- http://envfor.nic.in
- http://mnes.nic.i
- http://tn.gov.in
- http://windpowerindia.com

Appendix 3

IRR Calculations

Financials without CDM Revenue

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Revenue		**577.9**	**577.9**	**577.9**	**577.9**	**577.9**	**577.9**	**577.9**	**577.9**	**577.9**	**577.9**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**
Less : Operating expenses																					
O & M expenses		0.00	0.00	0.00	66.50	69.83	73.32	76.98	80.83	84.87	89.12	93.57	98.25	103.16	108.32	113.74	119.42	125.40	131.67	138.25	145.16
Insurance charges		7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40
Reactive power charges		3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Administration charges		10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Project cash flows		557.4	557.4	557.4	490.9	487.6	484.1	480.4	476.6	472.6	468.3	435.3	430.6	425.7	420.5	415.1	409.4	403.5	397.2	390.6	383.7
Project cost	-4281.8																				
Net cash flow (Pre Tax)	-4281.8	557.4	557.4	557.4	490.9	487.6	484.1	480.4	476.6	472.6	468.3	435.3	430.6	425.7	420.5	415.1	409.4	403.5	397.2	390.6	383.7
Income Tax		4.8	4.8	6.6	4.6	8.0	11.3	14.7	16.2	15.8	15.5	12.7	12.3	16.6	35.4	34.9	137.8	135.8	133.7	131.5	129.1
Net cash flow (Post Tax)	-4281.8	552.6	552.6	550.8	486.3	479.6	472.8	465.8	460.4	456.7	452.8	422.6	418.3	409.1	385.1	380.2	271.6	267.6	263.5	259.1	254.5
Residual Value (end of 20th yr)																					296.7
Net Cash Flow for IRR	-4281.8	552.6	552.6	550.8	486.3	479.6	472.8	465.8	460.4	456.7	452.8	422.6	418.3	409.1	385.1	380.2	271.6	267.6	263.5	259.1	551.3
Project IRR (Post Tax)	**8.79%**																				

Financials with CDM

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Revenue		**682.0**	**682.0**	**682.0**	**682.0**	**682.0**	**682.0**	**682.0**	**682.0**	**682.0**	**682.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**	**549.0**
Less : Operating expenses																					
O & M expenses		0.00	0.00	0.00	66.50	69.83	73.32	76.98	80.83	84.87	89.12	93.57	98.25	103.16	108.32	113.74	119.42	125.40	131.67	138.25	145.16
Insurance charges		7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40
Reactive power charges		3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	3.11	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Administration charges		10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
CDM Transaction cost		22.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00										
Project cash flows		639.5	659.5	659.5	593.0	589.7	586.2	582.5	578.7	574.6	570.4	435.3	430.6	425.7	420.5	415.1	409.4	403.5	397.2	390.6	383.7
Project cost	-4281.8																				
Net cash flow (Pre Tax)	-4281.8	639.5	659.5	659.5	593.0	589.7	586.2	582.5	578.7	574.6	570.4	435.3	430.6	425.7	420.5	415.1	409.4	403.5	397.2	390.6	383.7
Income Tax		11.7	13.4	15.4	13.4	16.8	20.1	23.4	24.9	24.6	24.2	12.7	12.3	16.6	35.4	34.9	137.8	135.8	133.7	131.5	129.1
Net cash flow (Post Tax)	-4281.8	627.8	646.1	644.1	579.6	572.9	566.1	559.1	553.7	550.0	546.1	422.6	418.3	409.1	385.1	380.2	271.6	267.6	263.5	259.1	254.5
Residual Value (end of 20th yr)																					296.7
Net Cash Flow for IRR	-4281.8	627.8	646.1	644.1	579.6	572.9	566.1	559.1	553.7	550.0	546.1	422.6	418.3	409.1	385.1	380.2	271.6	267.6	263.5	259.1	551.3
Project IRR (Post Tax)	**10.96%**																				

I.Computation of Cost of Debt					
				(Rs.in lacs)	
Sl.no	Description	Amount o/s	Amount o/s	Average	Rate of Interest
				balance	
Debt :					
1	Term Loan	**3200**			6.75%
	Cost of Debt				**6.75%**
II.Computation of Cost of Equity					
Cost of equity Ke		=	Rf + (Rm-Rf) * B		
Where					
Ke		=	Cost of equity		
Rf		=	Risk free rate		
Rm		=	Return of the market		
B		=	Beta of the stock		
Rf (GOI Bonds)		=	8.00%		
Rm		=	18.00%		
B		=	0.85		
Hene Ke		=	16.500%		
		=			
III.Calculation of Weights					
Description	As on 31.03	Weight			
	(Rs.in lacs)				
Equity capital	1081.84	0.25			
Debt	3200	0.75			
	4281.84				
IV.Calculation of Weighted Average Cost of Capital					
(Weights method)					
Description	Cost (%)	Weight (%)			
Equity capital	25.00%	0.25			

Debt	75.00%	0.75			
		1.00			
V.Calculation of Weighted Average Cost of Capital					
(Market value method)					
Description	Cost		Weight	WACC	
	(%)			(%)	
Equity capital	16.50%		0.25	4.13	
Debt	6.75%		0.75	5.06	
			WACC	**9.19**	